

Form PTO-1449

U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.

Serial No.

00-713-i9

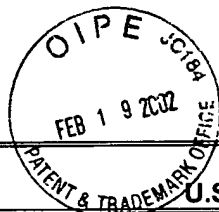
09/973,638

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

Applicant: Chad A. Mirkin, et al.

Filing Date: 10/10/01

Group: 1656

**U.S. PATENT DOCUMENTS**

aminer tial		Document Number	Date	Name	Class	Subclass	Filing Date
<i>h</i>	1.	5,288,609	02/08/94	Mroczkowski, et al.	<del>_____</del>	<del>_____</del>	
	2.	5,284,748	02/22/94	Engelhardt, et al.	<del>_____</del>	<del>_____</del>	
	3.	5,360,895	11/01/94	Hainfield, et al.	<del>_____</del>	<del>_____</del>	
	4.	5,384,265	01/24/95	Kidwell, et al.	<del>_____</del>	<del>_____</del>	
	5.	5,472,881	12/05/95	Beebe, et al.	<del>_____</del>	<del>_____</del>	
	6.	5,599,668	02/04/97	Stimpson, et al.	<del>_____</del>	<del>_____</del>	
	7.	5,637,508	06/10/97	Kidwell, et al.	<del>_____</del>	<del>_____</del>	
	8.	5,751,018	05/12/98	Alivisatos, et al.	<del>_____</del>	<del>_____</del>	
	9.	5,939,021	08/17/99	Hansen, et al.	<del>_____</del>	<del>_____</del>	
<i>h</i>	10.	5,990,479	11/23/99	Weiss, et al.	<del>_____</del>	<del>_____</del>	

COPY OF PAPERS  
ORIGINALLY FILED

RECEIVED

APR 23 2002

TECH CENTER 1600/2900

**FOREIGN PATENT DOCUMENTS**

		Document Number	Date	Country	Class	Subclass	Translation Yes No
<i>h</i>	11.	WO 93/10564	27 May 93	PCT	<del>_____</del>	<del>_____</del>	
	12.	WO 98/10289	12 March 98	PCT	<del>_____</del>	<del>_____</del>	
	13.	WO 99/23258	14 May 99	PCT	<del>_____</del>	<del>_____</del>	
	14.	WO 99/21934	06 May 99	PCT	<del>_____</del>	<del>_____</del>	
<i>h</i>	15.	WO 99/20789	29 April 99	PCT	<del>_____</del>	<del>_____</del>	

**OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.**

<i>h</i>	16.	O.D. Velez, et al., "In Situ Assembly of Collordal Particles into Miniaturized Biosensors," <i>Langmuir</i> , Vol. 15, No. 11, pp. 3693-3698, May 25, 1999
----------	-----	--

aminer

*Chad A. Mirkin*

Date Considered

4/2/03

AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through if not in conformance and not considered. Include copy of this form with any communication.

COPY OF PAPER IS  
ORIGINALLY FILED

Sheet 1 of 2

Form PTO-1449  
Rev. 2-32)

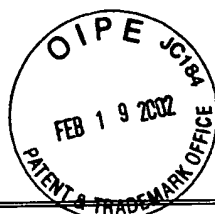
U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.  
00-713-i9

Serial No.  
09/973,638

INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT

(Use several sheets if necessary)



RECEIVED

FEB 27 2002

Applicant:

Chad A. Mirkin, et al.

TECH CENTER 1600/2900

Filing Date:

October 10, 2001

Group:

1656

U.S. PATENT DOCUMENTS

Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
<i>h</i>	1.	5,599,668	02/04/97	Stimpson, et al.			
<i>h</i>	2.	5,990,479	11/23/99	Weiss, et al.			

RECEIVED

FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation Yes No

APR 23 2002

TECH CENTER 1600/2900

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

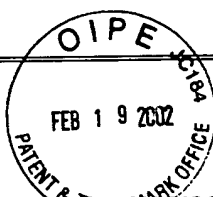
<i>h</i>	3.	Stimpson, et al., "Real-time detection of DNA hybridization and melting on oligonucleotide arrays by using optical wave guides," <i>Proc. Natl. Acad. Sci.</i> , Vol. 92, pp. 6379-6383, California Institute of Technology (1995) U.S.
	4.	Storhoff, et al., "Strategies for Organizing Nanoparticles into Aggregate Structures and Functional Materials," <i>Journal of Cluster Science</i> , Vol. 8, No. 2, pp. 179-217, Plenum Publishing Corporation (1997) U.S.
	5.	Storhoff, et al., "One-Pot Colorimetric Differentiation of Polynucleotides with Single Base Imperfections Using Gold Nanoparticle Probes," <i>J. Am. Chem. Soc.</i> , Vol. 120, pp. 1961-1964, American Chemical Society (1998) U.S.
	6.	Velev, et al., "In Situ Assembly of Colloidal Particles into Miniaturized Biosensors," <i>Langmuir</i> , Vol. 15, No. 11, pp. 3693-3698, American Chemical Society (1999) U.S.
<i>h</i>	7.	Zhu, et al., "The First Raman Spectrum of an Organic Monolayer on a High-Temperature Superconductor: Direct Spectroscopic Evidence for a Chemical Interaction between an Amine and YBa <sub>2</sub> Cu <sub>3</sub> O <sub>7-δ</sub> ," <i>J. Am. Chem. Soc.</i> , Vol. 119, pp. 235-236, American Chemical Society (1997) U.S.

AMINER

DATE CONSIDERED

4/2/03

AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation in conformance and not considered. Include copy of this form with next communication.

IRM PTO-1449  
av. 2-32)U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.

00-713-i9

Serial No.

09/973,638

INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT

(Use several sheets if necessary)

RECEIVED

FEB 27 2002

Applicant:

TECH CENTER 1600/290

Chad A. Mirkin, et al.

Filing Date:

October 10, 2001

Group:

1656

COPY OF PAPERS  
ORIGINALLY FILED

## U.S. PATENT DOCUMENTS

aminer initial	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate

## FOREIGN PATENT DOCUMENTS

Document Number	Date	Country	Class	Subclass	Translation Yes No

RECEIVED

APR 23 2002

TECH CENTER 1600/2900

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

8.	Yguerabide, et al., "Light-Scattering Submicroscopic Particles as Highly Fluorescent Analogs and Their Use as Tracer Labels in Clinical and Biological Applications," I. Theory, <i>Analytical Biochemistry</i> , Vol. 262, pp. 137-156 (1998) U.S.
9.	Yguerabide, et al., "Light-Scattering Submicroscopic Particles as Highly Fluorescent Analogs and Their Use as Tracer Labels in Clinical and Biological Applications," II. Experimental Characterization, <i>Analytical Biochemistry</i> , Vol. 262, pp. 157-176 (1998) U.S.

AMINER

DATE CONSIDERED

4/2/03

AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation in conformance and not considered. Include copy of this form with next communication.



IRM PTO-1449  
ev. 2-32)

U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.

00-713-i9

Serial No.

09/973,638

INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT

(Use several sheets if necessary)



RECEIVED

APR 23 2002

TECH CENTER 1600/2900

Applicant:

Chad A. Mirkin, et al.

Filing Date:

October 10, 2001

Group:

1656

COPY OF PAPERS  
ORIGINALLY FILED

U.S. PATENT DOCUMENTS

aminer initial	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate

FOREIGN PATENT DOCUMENTS

Document Number	Date	Country	Class	Subclass	Translation Yes No

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

u	1.	Brada, et al., "Golden Blot" – Detection of Polyclonal and Monoclonal Antibodies Bound to Antigens on Nitrocellulose by Protein A-Gold Complexes, <i>Analytical Biochemistry</i> , Vol. 42, pp. 79-83 (1984) U.S.
	2.	Dunn, et al., "A Novel Method to Map Transcripts: Evidence for homology between an Adenovirus mRNA and Discrete Multiple Regions of the Viral Genome, <i>Cell</i> , Vol. 12, pp. 23-36, (1997) U.S.
	3.	Hacker, "High performance Nanogold – Silver in situ hybridisation, <i>Eur. J. Histochem</i> , Vol. 42, pp. 111-120 (1998) U.S.
	4.	Ranki, et al., "Sandwich hybridization as a convenient method for the detection of nucleic acids in crude samples," <i>Gene</i> , Vol. 21, pp. 77-85 (1983) U.S.
u	5.	Romano, et al., "An antiglobulin reagent labelled with colloidal gold for use in electron microscopy," <i>Immunochemistry</i> , Vol. 11, pp. 521-522 (1974) Great Britain

AMINER

DATE CONSIDERED

4/2/03

AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation in conformance and not considered. Include copy of this form with next communication.

Form PTO-1449

U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.

00-713-i9

Serial No.

09/973,638

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

Applicant: Chad A. Mirkin, et al.

Filing Date: 10/10/01

Group: 1656

**U.S. PATENT DOCUMENTS**

Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date
<i>h</i>	1.	4,193,983	3/18/80	Ullman et al.			
	2.	4,256,834	3/17/81	Zuk et al.			
	3.	4,261,968	4/14/81	Ullman et al.			
	4.	4,313,734	2/2/82	Leuversing			
	5.	4,318,707	3/9/82	Litman et al.			
	6.	4,650,770	3/17/87	Liu et al.			
	7.	4,713,348	12/15/87	Ullman			
	8.	4,853,335	8/1/89	Olsen et al.			
	9.	4,868,104	9/19/89	Kura et al.			
	10.	5,225,064	7/6/93	Henkens et al.			
	11.	5,294,369	3/15/94	Shigekawa et al.			
<i>W</i>	12.	5,384,073	1/24/95	Shigekawa et al.			
	<del>13.</del>	<del>5,384,265</del>	<del>1/24/95</del>	<del>Kidwell et al.</del> <i>Dup</i>			
<i>W</i>	14.	5,460,831	10/24/95	Kossovsky et al.			
	<del>15.</del>	<del>5,472,881</del>	<del>12/5/95</del>	<del>Beebe et al.</del> <i>Dup</i>			
<i>W</i>	16.	5,514,602	05/07/96	Brooks, Jr. et al.			
	17.	5,521,289	5/28/96	Hainfeld et al.			
	18.	5,543,158	8/6/96	Gref et al.			
	19.	5,571,726	11/05/96	Brooks, Jr. et al.			
	20.	5,665,582	9/9/97	Kaushch et al.			
<i>W</i>	21.	5,681,943	10/28/97	Letsinger et al.			

**OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.**

--	--

Examiner

*Ben Li*

Date Considered

*4/2/03*

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with any communication.

Form PTO-1449	U.S. Department of Commerce Patent and Trademark Office	Atty. Docket No. 00-713-i9	Serial No. 09/973,638
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>		Applicant: Chad A. Mirkin, et al.	
		Filing Date: 10/10/01	Group: 1656

## U.S. PATENT DOCUMENTS

Examiner's Initial	Document Number	Date	Name	Class	Subclass	Filing Date

## FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country	Class	Subclass	Translation Yes No
22.	WO 89/06801	7/27/89	PCT			
23.	WO 97/40181	10/30/97	PCT			
24.	WO 98/04740	2/5/98	PCT			
25.	WO 99/23258	10/30/98	PCT			
26.	0 630 974 A2	06/21/94	EPO			
27.	0 667 398 A2	8/16/95	EPO			

## OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.

28.	Alivisatos et al., "Organization of 'nanocrystal molecules' using DNA," <i>Nature</i> , Vol. 382, pp. 609-611 (1996)
29.	Bain, et al., "Modeling Organic Surfaces with Self-Assembled Monolayers," <i>Angew. Chem. Int. Ed. Engl.</i> , Vol. 28, pp. 506-512 (1989)
30.	Bradley, "The Chemistry of Transition Metal Colloids," <i>Clusters and Colloids: From Theory to Applications</i> G. Schmid, Editor, BCH, Weinheim, New York, pp. 459-542 (1994)
31.	Brust et al., "Novel Gold-Dithiol Nano-Networks with Non-Metallic Electronic Properties," <i>Adv. Mater.</i> , Vol. 7, pp. 795-797 (1995)
32.	Chen et al., "A Specific Quadrilateral Synthesized from DNA Branched Junctions," <i>J. Am. Chem. Soc.</i> , Vol. 111, pp. 6402-6407 (1989)
33.	Chen & Seeman, "Synthesis from DNA of a molecule with the connectivity of a cube," <i>Nature</i> , Vol. 350, pp. 631-633 (1991)
34.	Chen et al., "Crystal Structure of a Four-Stranded Intercalated DNA: d(C <sub>4</sub> ) <sup>††</sup> <i>Biochem.</i> , Vol. 33, pp. 13540-13546 (1994)
35.	Dagani, "Supramolecular Assemblies DNA to organize gold nanoparticles," <i>Chemical &amp; Engineering News</i> , p. 6-7, August 19, 1996

Examiner	Date Considered
<i>[Signature]</i>	4/2/03

AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through if not in conformance and not considered. Include copy of this form with any communication.

Form PTO-1449	U.S. Department of Commerce Patent and Trademark Office	Atty. Docket No.  00-713-i9	Serial No.  09/973,638
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Applicant: Chad A. Mirkin, et al.	
		Filing Date: 10/10/01	Group: 1656


## U.S. PATENT DOCUMENTS

Examiner's Initial	Document Number	Date	Name	Class	Subclass	Filing Date

RECEIVED

## OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.

36.	Dubois & Nuzzo, "Synthesis, Structure, and Properties of Model Organic Surfaces," <i>Annu. Rev. Phys. Chem.</i> , Vol. 43, pp. 437-464 (1992)
37.	Elghanian et al., "Selective Colorimetric Detection of Polynucleotides Based on the Distance-Dependent Optical Properties of Gold Nanoparticles," <i>Science</i> , Vol. 277, pp. 1078-1081 (1997)
38.	Grabar et al., "Preparation and Characterization of Au Colloid Monolayers," <i>Anal. Chem.</i> Vol. 67, pp. 735-743 (1995)
39.	Hacia et al., "Detection of heterozygous mutations in BRCA1 using high density oligonucleotide arrays and two-colour fluorescence analysis," <i>Nature Genet.</i> , Vol. 14, pp. 441-447 (1996)
40.	Jacoby, "Nanoparticles change color on binding to nucleotide target," <i>Chemical &amp; Engineering News</i> , p. 10, August 25, 1997
41.	Letsinger et al., "Use of Hydrophobic Substituents in Controlling Self-Assembly of Oligonucleotides," <i>J. Am. Chem. Soc.</i> , Vol. 115, pp. 7535-7536 (1993)
42.	Letsinger et al., "Control of Excimer Emission and Photochemistry of Stilbene Units by Oligonucleotide Hybridization," <i>J. Am. Chem. Soc.</i> , Vol. 116, pp. 811-812 (1994)
43.	Marsh et al., "A new DNA nanostructure, the G-wire, imaged by scanning probe microscopy," <i>Nucleic Acids Res.</i> , Vol. 23, pp. 696-700 (1995)
44.	Mirkin, "H-DNA and Related Structures," <i>Annu. Review Biophys. Biomol. Struct.</i> , Vol. 23, pp. 541-576 (1994)
45.	Mirkin et al., "A DNA-based method for rationally assembling nanoparticles into macroscopic materials," <i>Nature</i> , Vol. 382, pp. 607-609 (1996)
46.	Mirkin et al., "DNA-Induced Assembly of Gold Nanoparticles: A Method for Rationally Organizing Colloidal Particles into Ordered Macroscopic Materials," <i>Abstract 249, Abstracts of Papers Part 1, 212 ACS National Meeting 0-8412-3402-7, American Chemical Society, Orlando, FL, August 25-29, 1996</i>
47.	Mucic et al., "Synthesis and characterizations of DNA with ferrocenyl groups attached to their 5'-termini: electrochemical characterization of a redox-active nucleotide monolayer," <i>Chem. Commun.</i> , pp. 555-557 (1996)
48.	Mulvaney, "Surface Plasmon Spectroscopy of Nanosized Metal Particles," <i>Langmuir</i> , Vol. 12, pp. 788-800 (1996)
49.	Rabke-Clemmer et al., "Analysis of Functionalized DNA Adsorption on Au(111) Using Electron Spectroscopy," <i>Langmuir</i> , Vol. 10, pp. 1796-1800 (1994)

Examiner 	Date Considered 4/2/03
---	---------------------------

AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with any communication.



Form PTO-1449

U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.

Serial No.

00-713-i9

09/973,638

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

Applicant: Chad A. Mirkin, et al.

Filing Date: 10/10/01

Group: 1656

**U.S. PATENT DOCUMENTS**

Examiner's Initial	Document Number	Date	Name	Class	Subclass	Filing Date

**FOREIGN PATENT DOCUMENTS**

Document Number	Date	Country	Class	Subclass	Translation Yes No

**OTHER DOCUMENTS - Including Author, Title, Date, Page, etc.**

50.	Roubi, "MOLECULAR MACHINES - Nanodevice with rotating arms assembled from synthetic DNA," <i>Chemical &amp; Engineering News</i> , p. 13, (Jan. 1999)
51.	Seeman et al., "Synthetic DNA knots and catenanes," <i>New J. Chem.</i> , Vol. 17, pp. 739-755 (1993)
52.	Shaw & Wang, "Knotting of a DNA Chain During Ring Closure," <i>Science</i> , Vol. 260, pp. 533-536 (1993)
53.	Shekhtman et al., "Stereostructure of replicative DNA catenanes from eukaryotic cells," <i>New J. Chem.</i> Vol. 17, pp. 757-763 (1993)
54.	Smith and Feigon, "Quadruplex structure of Oxytricha telomeric DNA oligonucleotides," <i>Nature</i> , Vol. 356, pp. 164-168 (1992)
55.	Thein et al., "The use of synthetic oligonucleotides as specific hybridization probes in the diagnosis of genetic disorders," 2 <sup>nd</sup> Ed., K.E. Davies, Ed., Oxford University Press, Oxford, New York, Tokyo, p. 21-33 (1993)
56.	Wang et al., "Assembly and Characterization of Five-Arm and Six-Arm DNA Brached Junctions," <i>Biochem.</i> , Vol. 30, pp. 5667-5674 (1991)
57.	Wang et al., "A DNA Aptamer Which Binds to and Inhibits Thrombin Exhibits a New Structural Motif for DNA," <i>Biochem.</i> , Vol. 32, pp. 1899-1904 (1993)
58.	Weisbecker et al., "Molecular Self-Assembly of Aliphatic Thiols on Gold Colloids," <i>Langmuir</i> , Vol. 12, pp. 3763-3772 (1996)
59.	Wells, "Unusual DNA Structures," <i>J. Biol. Chem.</i> , Vol. 263, pp. 1095-1098 (1988)
60.	Zhang et al., "Informational Liposomes: Complexes Derived from Cholesteryl-conjugated Oligonucleotides and Liposomes," <i>Tetrahedron Lett.</i> , Vol. 37, pp. 6243-6246 (1996)

Examiner

Date Considered

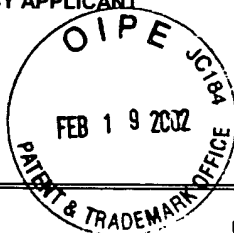
AMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with any communication.

U.S. Department of Commerce  
Patent and Trademark Office

Atty. Docket No.  
00-713-i9

Serial No.  
09/973.638

### INFORMATION DISCLOSURE STATEMENT BY APPLICANT



Applicant: MIRKIN et al.





**Filing Date: 10/10/01**

Group: 1656

## U.S. PATENT DOCUMENTS

EXHIBIT DOCUMENTS							
Exhibit Number	Document Number	Date	Name	Class	Subclass	Filing Date	

## FOREIGN PATENT DOCUMENTS

PATENT PRIORITY DOCUMENTS							
		Document Number	Date	Country	Class	Subclass	Translation Yes No
<i>R</i>	1.	WO 92/04469	19 March 1992	PCT			X
<i>R</i>	2.	WO 90/02205	8 March 1990	PCT			X

**OTHER DOCUMENTS - Including Author, Title, Date, Pertinent Pages, Etc.**

[illegible]**xaminer****Date Considered**

**AMINER:** Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if in conformance and not considered. Include copy of this form with any communication.